In the Claims:

1. A method of automatically determining one or more sensor locations for sensing a surface of a physical part, comprising:

inputting a CAD model, which is representative of the surface of the physical part, into a sensor planner;

inputting a sensor model, which is representative of a 3D image capturing sensor, into said sensor planner

subdividing said CAD model of the surface of the physical part into a plurality of discrete partitions;

grouping said plurality of discrete partitions into one or more subgroups based on visibility criterion; and

outputting automatically a set of viewing positions and orientations for said sensor.

2. The method as recited in claim 1, wherein said plurality of discrete partitions are formed in the shape of triangles.

3. The method as recited in claim 1, wherein said grouping further comprises selecting a seed partition from said plurality of partitions.

4. The method as recited in claim 3, wherein said grouping further comprises forming at least one flat

patch, which includes all partitions adjacent said seed partition having a normal vector that forms an angle with an average normal of said grouping that is less than a predetermined value.

5. The method as recited in claim 4 further comprising:

forming a plurality of flat patches that together capture the entire surface of the physical part.

6. The method as recited in claim 4 further comprising:

constructing a bounding box around said at least one flat patch, said bounding box having a front face representing a direction where the projected area of said at least one flat patch onto said front face is maximized.

7. The method as recited in claim 6, further comprising:

determining the sensor position closest to the surface that encompasses all of said at least one flat patch.

8. The method as recited in claim 7, further comprising:

determining the sensor position farthest from the surface of the part that meets predetermined resolution requirements.

9. The method as recited in claim 8, further comprising:

locating a sensor position that meets said predetermined resolution requirements.

10. The method as recited in claim 9, further comprising:

outputting said located sensor position to a controller in order to automatically position said sensor.

11. The method as recited in claim 10, further comprising:

splitting said at least one flat patch if said front face is too large for said sensor to capture said at least one flat patch and satisfy said predetermined resolution requirements.

12. An automated CAD-guided sensor planning system, comprising:

a CAD model, which is a computer representation of one or more surfaces of a physical object that are to be measured;

a sensor model, which is a mathematical representation of a 3-D image capturing sensor; and

a sensor planner that receives said CAD model and said sensor model and utilizes them to automatically determine a set of sensor viewing positions and orientations.

13. The method as recited in claim 12, wherein said sensor model includes descriptions of one or more variables about said sensor: visibility, resolution, field of view, focal length and depth of field.

14. the method as recited in claim 12, further comprising:

a controller for receiving said set of sensor viewing positions and orientations and using them to control a physical device to locate said sensor accordingly.

15. The method as recited in claim 14, wherein said physical device is a coordinate measurement machine.

16. The method as recited in claim 14, wherein said physical device is a robot.

17. An automated CAD-guided sensor planning method, comprising:

providing a CAD model of a physical part to be examined;

providing a sensor model representative of a 3-D image capturing device;

tessellating at least one surface of said CAD model of said physical part by subdividing it into a plurality of partitions;

determining at least one flat patch on said at least one surface, said flat patch being comprised of one or more of said plurality of partitions;

determining a closest position for the sensor to said at least one surface that encompasses all of said at least one flat patch;

determine a furthest position of the sensor to said at least one surface having sufficient resolution; and

outputting a sensor location based on said closest position that encompasses said entire flat patch and said farthest position with sufficient resolution.

18. The method as recited in claim 17, wherein said at least one surface is subdivided into a plurality of triangles.

19. The method as recited in claim 17, further comprising:

determining a closest position for the sensor to said at least one surface that encompasses all of said at least one flat patch.

20. The method as recited in claim 19, further comprising:

determining a furthest position of the sensor to said at least one surface having sufficient resolution.

21. The method as recited in claim 20, further comprising:

constructing a bounding box around said at least one flat patch, said bounding box having a front

face representing a direction where the projected area of said at least one flat patch onto said front face is maximized.

22. The method as recited in claim 21, further comprising:

splitting said at least one flat patch if said front face is too large for said sensor to capture said at least one flat patch and satisfy predetermined resolution requirements.